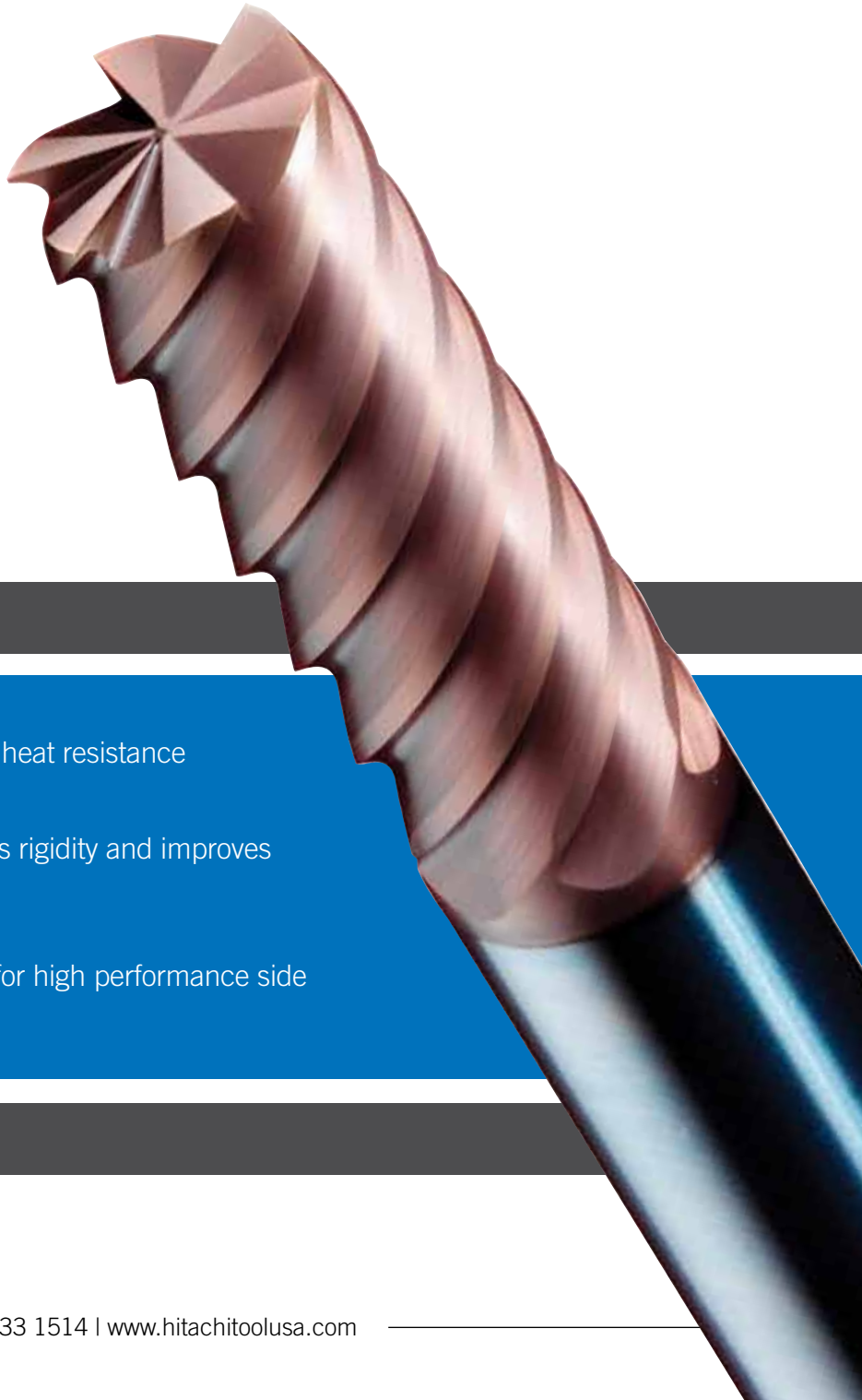
CEPR

High Precision Multi-Flute End Mills for Maximum Efficiency and Tool Life



FEATURES

TH Coating has excellent hardness and heat resistance properties

Newly designed flute geometry increases rigidity and improves chip
evacuation

CEPR-TH Multi-Flute Square End Mills for high performance side milling & finishing

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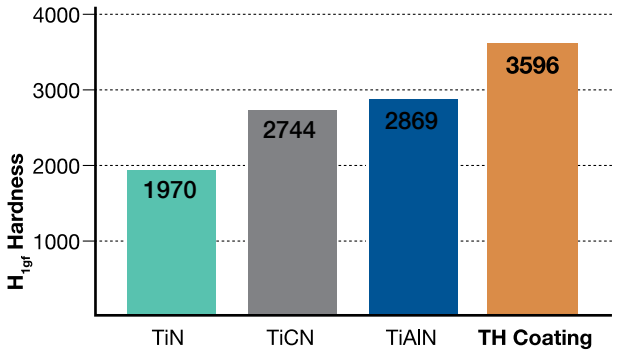
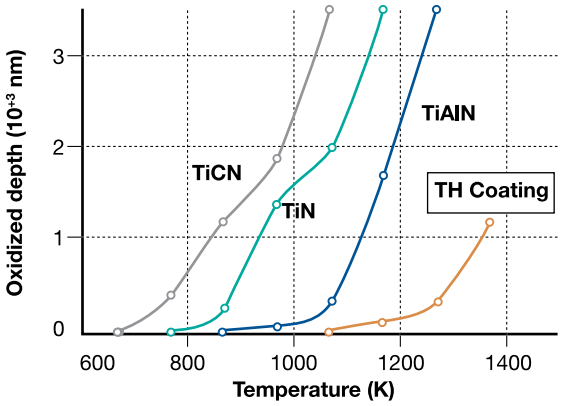
FEATURES

1. TH Coating's Hardness and Oxidation Resistance

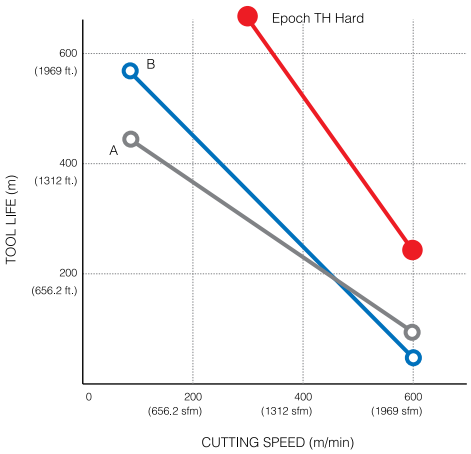
As the charts demonstrate, the revolutionary TH Coating has excellent hardness and oxidation resistance compared to conventional coatings. These properties allow the Epoch Series End Mills to offer greater performance in hard steels and show a vast improvement in cutting tool life.



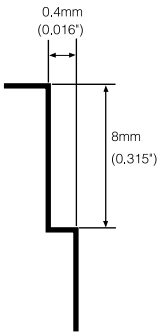


2. Cutting Performance: CEPR

The data below shows that the CEPR achieved double the tool life of competitors' cutting tools in the dry machining of die steel.



Cutting Tool	Ø8mm (0.315") 6 Flute CEPR6080-TH
Working Material	H13 (52HRC)
Cutting Speed	Vc= 300 – 500m/min (984-1640 sfm)
Feed	fz= 0.07mm/tooth (0.0028 in/tooth)
Depth of Cut	doc 8mm x woc 0.4mm (0.315" x 0.0158")
Cutting Method	Straight down cut, air blow



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Square Multi-Flute Style

SQUARE NOSE | SEMI-FINISHING | FINISHING | 70 HRC 70 | 4 FLUTES | 6 FLUTES | TH COATING

D (Ø1-6)	0/-0.015
D (Ø8-12)	0/-0.02

CEPR

Part No.	Stock	Flutes	Size (mm) ØD	l	L	Ød
CEPR4010-TH	●	4	1	3.5	60	6
CEPR4015-TH	□	4	1.5	5	60	6
CEPR4020-TH	●	4	2	7.0	60	6
CEPR4025-TH	□	4	2.5	8	60	6
CEPR4030-TH	●	4	3	10.0	60	6
CEPR4035-TH	□	4	3.5	12	60	6
CEPR4040-TH	●	4	4	12.0	60	6
CEPR4045-TH	□	4	4.5	15	60	6
CEPR4050-TH	●	4	5	15.0	60	6
CEPR4055-TH	□	4	5.5	15	60	6
CEPR6060-TH	●	6	6	15.0	60	6
CEPR6065-TH	□	6	6.5	20	75	8
CEPR6070-TH	□	6	7.0	20	75	8
CEPR6075-TH	□	6	7.5	20	75	8
CEPR6080-TH	●	6	8	20.0	75	8
CEPR6085-TH	□	6	8.5	25	80	10
CEPR6090-TH	□	6	9.0	25	80	10
CEPR6095-TH	□	6	9.5	25	80	10
CEPR6100-TH	●	6	10	25.0	80	10
CEPR6105-TH	□	6	10.5	30	100	12
CEPR6110-TH	□	6	11.0	30	100	12
CEPR6115-TH	□	6	11.5	30	100	12
CEPR6120-TH	●	6	12	30.0	100	12

CEPR-CR

Part No.	Stock	Flutes	Size (mm) Corner Radius	ØD	l	L	Ød
CEPR6060-03-TH	□	6	0.3	6	15	60	6
CEPR6060-05-TH	□	6	0.5	6	15	60	6
CEPR6060-10-TH	□	6	1.0	6	15	60	6
CEPR6080-03-TH	□	6	0.3	8	20	75	8
CEPR6080-05-TH	□	6	0.5	8	20	75	8
CEPR6080-10-TH	□	6	1.0	8	20	75	8
CEPR6100-05-TH	□	6	0.5	10	25	80	10
CEPR6100-10-TH	□	6	1.0	10	25	80	10
CEPR6100-15-TH	□	6	1.5	10	25	80	10
CEPR6100-20-TH	□	6	2.0	10	25	80	10
CEPR6120-05-TH	□	6	0.5	12	30	100	12
CEPR6120-10-TH	□	6	1.0	12	30	100	12
CEPR6120-15-TH	□	6	1.5	12	30	100	12
CEPR6120-20-TH	□	6	2.0	12	30	100	12

□ = Stocked items in Japan

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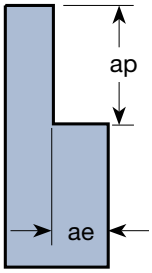
Cutting Conditions
Side Milling
(Metric)



Work Material (Hardness)	Cutting Range	Depth of cut	Cutting Cond.	Tool Dia. (mm) 1	2	3	4	6	8	10	12
Tool Steel (25-35HRC)	High Speed	ap=1.5 ae=0.1D	Vc (m/min)	250	250	250	280	280	280	280	280
			N (RPM)	79600	39800	26500	22300	14900	11100	8900	7400
			fz (mm/t)	0.008	0.018	0.029	0.042	0.060	0.080	0.100	0.110
			Vf (mm/min)	2550	2870	3070	3750	5360	5330	5340	4880
	General	ap=1.5 ae=0.1D	Vc (m/min)	60	120	120	140	140	140	140	140
			N (RPM)	19100	19100	12700	11100	7400	5600	4500	3700
			fz (mm/t)	0.008	0.018	0.029	0.042	0.065	0.085	0.100	0.110
			Vf (mm/min)	610	1380	1470	1860	2890	2860	2700	2440
Pre-hardened steel (35-45HRC)	High Speed	ap=1.5 ae=0.05D	Vc (m/min)	250	250	250	260	260	260	260	260
			N (RPM)	79600	39800	26500	20700	13800	10300	8300	6900
			fz (mm/t)	0.008	0.016	0.026	0.038	0.055	0.075	0.090	0.100
			Vf (mm/min)	2550	2550	2760	3150	4550	4640	4480	4140
	General	ap=1.5D ae=0.1D	Vc (m/min)	60	100	100	120	120	120	120	120
			N (RPM)	19100	15900	10600	9500	6400	4800	3800	3200
			fz (mm/t)	0.005	0.011	0.018	0.026	0.040	0.055	0.065	0.070
			Vf (mm/min)	380	700	760	990	1540	1580	1480	1340
Hardened steel (45-55HRC)	High Speed	ap=1.5 ae=0.03D	Vc (m/min)	200	200	200	230	230	230	230	230
			N (RPM)	63700	31800	21200	18300	12200	9200	7300	6100
			fz (mm/t)	0.007	0.014	0.023	0.033	0.050	0.065	0.080	0.090
			Vf (mm/min)	1780	1780	1950	2420	3660	3590	3500	3290
	General	ap=1.5 ae=0.06D	Vc (m/min)	60	80	80	100	100	100	100	100
			N (RPM)	19100	12700	8500	8000	5300	4000	3200	2700
			fz (mm/t)	0.005	0.010	0.016	0.023	0.035	0.045	0.055	0.060
			Vf (mm/min)	380	510	540	740	1110	1080	1060	970
Hardened steel (55-65HRC)	High Speed	ap=1.5D ae=0.02D	Vc (m/min)	150	150	150	180	180	180	180	180
			N (RPM)	47700	23900	15900	14300	9500	7200	5700	4800
			fz (mm/t)	0.006	0.013	0.021	0.030	0.045	0.060	0.070	0.080
			Vf (mm/min)	1140	1240	1340	1720	2570	2590	2390	2300
	General	ap=1.5D ae=0.04D	Vc (m/min)	60	60	60	80	80	80	80	80
			N (RPM)	19100	9500	6400	6400	4200	3200	2500	2100
			fz (mm/t)	0.004	0.009	0.015	0.021	0.030	0.040	0.050	0.055
			Vf (mm/min)	310	340	380	540	760	770	750	690
Hardened steel (65-70HRC)	High Speed	ap=1.5D ae=0.02D	Vc (m/min)	100	100	100	130	130	130	130	130
			N (RPM)	31800	15900	10600	10300	6900	5200	4100	3400
			fz (mm/t)	0.005	0.012	0.019	0.027	0.040	0.055	0.065	0.070
			Vf (mm/min)	640	760	810	1110	1660	1720	1600	1430
	General	ap=1.5D ae=0.04D	Vc (m/min)	40	40	40	60	60	60	60	60
			N (RPM)	12700	6400	4200	4800	3200	2400	1900	1600
			fz (mm/t)	0.004	0.008	0.013	0.019	0.030	0.040	0.045	0.050
			Vf (mm/min)	200	200	220	360	580	580	510	480